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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,993	03/31/2004	Edward Raymond Dowski JR.	420229	6078
30955	7590	08/25/2004	EXAMINER	
LATHROP & GAGE LC 4845 PEARL EAST CIRCLE SUITE 300 BOULDER, CO 80301			CHAWAN, SHEELA C	
			ART UNIT	PAPER NUMBER
			2625	

DATE MAILED: 08/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/813,993	Applicant(s) DOWSKI ET AL.	
	Examiner Sheela C Chawan	Art Unit 2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 19 and 27-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18, 20-26 and 31-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 19 and 27-30 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/31/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restriction

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-18, 20-26, 31-34, are drawn to an optical imaging system for reducing focus-related aberrations induced by an intervening medium, classified in class 382, sub class 128.

II. Claim 19 is drawn to an imaging system for imaging acoustical waves through a medium, classified in class 367, sub class 7.

III. Claims 27- 30 are drawn to an anti-reflection optical imaging system, classified in class 257-sub class 437.

The inventions are distinct, each from the other because of the following reasons:

Inventions I, II and III, are related as subcombination usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention group I has separate utility such as an optical imaging system for reducing focus-related aberrations induced by an intervening medium. Invention group II has separate utility such as an imaging system for imaging acoustical waves through a medium. Invention group III has separate utility such as an anti-reflection optical imaging system.

2. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their classification and recognized divergent subject matter, restriction for examination purposes as indicated is proper.

3. A telephone call was made to Mr. Curtis Vock on 8/16/04 to request an oral election to the above restriction requirement, Mr. Curtis Vock has elected group I invention and the claims are 1-18, 20-26, 31-34.
4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventor ship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventor ship must be accompanied by a diligently-filed petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(h).

DETAILED ACTION

Drawings

1. The Examiner has approved drawings filed on 3/31/04.

Claim Rejections - 35 U.S.C. § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 15 is rejected under 35 U.S.C. 102(b) as being anticipated by Lisson et al. (US.5,221,834).

As to claim 15, a task-based optical imaging system for reducing focus-related aberrations induced by an intervening medium, comprising:

optics, including a wave front coding mask (opaque mask generating local wavefront errors, column 3, lines 54- 57), for imaging a wavefront of the imaging system to an intermediate image (fig 10, point source image element 50) and for modifying (column 5, lines 30-64) phase of the wavefront (column 3, lines 48-57) Such that an optical transfer function of the optical (column 3, lines 58- 60) imaging system is substantially invariant to the focus-related aberrations induced, over time, by the intervening medium (column 5, lines 60-64, column 13, lines 23-47), and a detector for detecting the intermediate image (fig 10, point of source image element 50).

Claim Rejections - 35 U.S.C. § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 31 is rejected under 35 U.S.C. 102(b) as being anticipated by Lisson et al. (US.5,221,834).

As to claim 31, Lisson discloses a biometric optical recognition system, comprising:

optics, including a wavefront coding mask, for imaging a wavefront of object to be recognized to an intermediate image (opaque mask generating local wavefront errors, column 3, lines 54- 57); and

a detector for detecting the intermediate image, (fig 10, point source image, item 50 corresponds to intermediate image) wherein a modulation transfer function detected by the detector contains no zeros such that subsequent task based image processing recognizes the object (column 5, lines 60- 64, column 13, lines 23- 47).

Claim Rejections - 35 U.S.C. § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 20 and 21 is rejected under 35 U.S.C. 102(b) as being anticipated by Galburt et al. (US.5,966,216).

As to claim 20, Galburt discloses an imaging system for reducing image distortion generated by reflections from a detector, comprising:

optics for imaging electromagnetic energy to the detector (column 5, lines 50-52);
and

tilt optics having a tilt surface that tilts away from a plane perpendicular to the imaged electromagnetic energy (column 5, lines 38-52), for reflecting back-scattered radiation to an aperture stop of the imaging system (column 6, lines 25-42).

As to claim 21, Galburt discloses the system of claim 20, the tilt optics being positioned at the aperture stop(column 6, lines 25-42).

Claim Rejections - 35 U.S.C. § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 24 – 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Duncan et al. (US.5,610,707).

As to claim 24, Duncan discloses a method for reducing optical distortions within an optical system employing adaptive optics, comprising the steps of:

modifying phase of a wavefront of the optical system (column 2, lines 31- 55, column 6, lines 11- 57); and

post-processing image data of the optical system (column 2, lines 47- 55) to remove phase effects induced by the wavefront coding mask, to control one or more of quilting, stuck actuator and piston error (column 2, lines 47- 55, column 4, lines 16- 52).

As to claim 25, Duncan discloses the method of the adaptive optics comprising a multi-segmented mirror (column 4, lines 16-30).

As to claim 26, Duncan discloses the method of claim 24, wherein the step of modifying comprises modifying phase such that no zeros exist in a modulated transfer function in the image data (column 4, lines 49- 65, column 5, lines 12- 27).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103[®] and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-14 and 16 - 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lisson et al. (US.5,221,834) in view of Mui (US. 6,674,519 B2).

As to claim 1, Lisson discloses an optical imaging (abstract, column 5, lines 14-15) system for reducing focus-related aberrations induced by an intervening medium, comprising.

Optics, including a wavefront coding mask (opaque mask generating local wavefront errors, column 3, lines 54- 57) for imaging a wavefront of the imaging

system to an intermediate image (fig 10, point source image element 50) and for modifying (column 5, lines 30- 64) phase of the wavefront (column 3, lines 48-57) such that an optical transfer function (column 3, lines 58- 60) of the optical imaging system is substantially invariant to the focus-related aberrations induced, over time, by the intervening medium (column 5, lines 60- 64, column 13, lines 23- 47).

A detector (fig 10, element 56) for detecting the intermediate image (fig 10, point source image element 50); and

Lisson discloses a method for providing feedback correction for an image device. Lisson is silent about a decoder for processing data from the detector to process phase effects induced by the optics to form a final image that is substantially clear of the focus-related aberrations.

Mui discloses optical phase front measurement unit. The system comprises of:
a decoder for processing data from the detector to process phase effects induced by the optics to form a final image that is substantially clear of the focus-related aberrations (column 1, lines 16-26, column 3, lines 8- 38, column 4, lines 55- 67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Lisson to include a decoder for processing data from the detector to process phase effects induced by the optics to form a final image that is substantially clear of the focus-related aberrations. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Lisson

by the teaching of Mui in order to maximize the beam delivery to the laser onto a target for compensating phase distortion by turbulence (as suggested by Mui at column 5, lines 46- 52).

As to claim 2, Lisson discloses the system wherein the aberrations comprise one or more of misfocus, spherical aberration, astigmatism, field curvature, chromatic aberration, temperature induced misfocus aberration, pressure induced misfocus aberration, trefoil and Coma (chromatic aberration, column 8, lines 30-38).

As to claims 3 and 17, Lisson discloses the system of the wavefront coding mask being configured to account for focus-related aberrations defined by Zernike polynomials (column 2, lines 9-13, column 8, lines 39- 43).

As to claim 4, Lisson discloses the system of the optics comprising one or more optical elements (column 1, lines 34- 49).

As to claim 5, Lisson discloses the system of the wavefront coding mask being integrated with the optical elements (column 3, line 13 through 28).

As to claim 6, Lisson discloses the system of the wavefront coding mask being integrated with one or more surfaces of the optical elements (column 1, lines 34- 49).

As to claim 7, Lisson discloses the system of the optical elements comprising adaptive optics (column 12, line 55 through column 13, line 13).

As to claim 8, Lisson discloses the system of the adaptive optics comprising the wavefront coding mask (column 13, lines 1-58).

As to claim 9, Lisson discloses the aberrations comprising one of piston error, quilting error and stuck actuator error (column 1, lines 53- 66).

As to claim 10, Lisson discloses the system wherein the wavefront coded structure is positioned at one or more of a principal plane of the imaging system, an image of a principal plane of the imaging system, an aperture stop of the imaging system, and an image of the aperture stop (column 5, lines 50- 64).

As to claim 11, Lisson discloses the system wherein the intermediate image defines a modulation transfer function that has no zeros for detected spatial frequencies of the detector (column 5, lines 50- 64, column 13, lines 32- 58).

As to claim 12, Mui discloses the system the decoder operable to restore each detected frequency of the wavefront in the final image (column 1, lines 16-26, column 3, lines 8-38, column 4, lines 55- 67).

As to claim 13, Lisson discloses the system of the decoder being space variant to control aberrations comprising coma (column 5, lines 50-64, column 13, 32-58).

As to claim 14, Mui discloses the system of the decoder being dynamic to continually produce the final image while the aberrations vary, over time.

As to claim 16, see the above rejection of claim 1.

As to claim 18, Mui discloses the method of medium comprising air, the method being employed within lithography (column 5, lines 53- 67).

7. Claims 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Galburt et al. (US.5,966,216), in view of Duncan et al. (US.5,610,707).

Regarding claim 22, Galburt discloses on-axis mask and wafer alignment system. Galburt is silent about a wavefront coded mask for modifying phase of a

wavefront imaged to the detector, and further comprising a postprocessor for further reducing distortion effects introduced.

Duncan discloses wavefront sensor for a staring imager. the system comprises of:

the optics comprising a wavefront coded mask for modifying phase of a wavefront imaged to the detector, and further comprising a postprocessor for further reducing distortion effects introduced by the reflections (abstract, column 2, lines 9- 55, column 4, lines 16- 37). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Galburt to include a wavefront coded mask for modifying phase of a wavefront imaged to the detector, and further comprising a postprocessor for further reducing distortion effects introduced. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Galburt by the teaching of Duncan in order to archive the focused and defocused image data for image post processing or evaluate the data in real time to compensate the optical system to correct wavefront aberrations (as suggested by Duncan at column 5, lines 46- 52).

As to claim 23, Duncan discloses the imaging system wherein the optics are constructed and arranged for coding the wavefront such that an optical transfer function of the imaging system is modified to be substantially invariant to focus-related (column 4, lines 16- 52), aberrations, the postprocessor being configured to remove effects induced by the wavefront coded mask on the wavefront (column 4, lines 16-52).

8. Claims 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lisson et al. (US.5,221,834) in view of Mui (US. 6,674,519 B2).

Regarding claim 32, Lisson discloses a method for providing feedback correction for an image device. Lisson is silent about a decoder, connected with the detector, for implementing the task based image processing.

Mui discloses optical phase front measurement unit. The system comprises of: a decoder, connected with the detector (column 1, lines 16-26, column 4, lines 47- 54, column 3, lines 8- 38, column 4, lines 55-67), for implementing the task based image processing (column 1, lines 16-26, column 4, lines 47- 54, column 3, lines 8- 38, column 4, lines 55-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Lisson to include a decoder, connected with the detector, for implementing the task based image processing. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Lisson by the teaching of Mui in order to maximize the beam delivery of the laser onto a target for compensating phase distortion by turbulence (as suggested by Mui at column 5, lines 46- 52).

As to claim 33, Mui discloses the system of the decoder operable as an all-pass filter (column 5, lines 43-45) in the frequency domain (column 2, lines 6-32).

As to claim 34, Mui discloses the system of the decoder operable as an attenuation filter in the frequency domain for magnifications of one or less (column 2, lines 6-32, column 5, lines 43-45).

Other prior art cited

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Aprahamian (US.5,002,380) discloses phase correction for larger optical system.

Gauthier et al. (US.4,938,596) discloses phase conjugate, common path interferometer.

Love et al.(US.6,107,617) discloses liquid crystal active optics correction for large space based optical system.

Khoury et al. (US.5,555,128) discloses phase coding technique for one-way image transmission through an aberrating medium.

Hajjar (Us.6,111,840) discloses reducing phase distortion in a near-field optical data storage system.


Contact Information

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sheela C Chawan whose telephone number is 703-305-4876. The examiner can normally be reached on Monday - Thursday 6 - 7.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 703-308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SCC
Sheela Chawan
Patent Examiner
Group Art Unit 2625
August 19, 2004


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